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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/753,397	01/03/2001	Yushi Jinno	2933SE-62-DIV	2805

22442 7590 12/31/2003

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EXAMINER

ECKERT II, GEORGE C

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/753,397

Applicant(s)

JINNO ET AL.

Examiner

George C. Eckert II

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
  - 2) ☒ Certified copies of the priority documents have been received in Application No. 08/997,763.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's amendment dated October 21, 2003, in which claims 7 and 8 were amended has been entered of record.

### *Election/Restrictions*

2. Claims 1-6 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Election was made **without** traverse in Paper No. 8.

### *Claim Objections*

3. Claim 7 is objected to because of the following informalities: on line 8, insert --of-- after "portions". Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 7-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Claims 7 and 8 contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The specification does not support the new limitation that the gate has a higher thermal conductivity than the insulating substrate. Claims 9-12 are rejected based on their dependency.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,548,132 to Batra et al. in view of US 5,793,460 to Yang. With regard to claims 7 and 8, Batra et al. teach, with reference to figures 4-7 and the text beginning in column 5, line 62, a bottom gate thin film transistor 50 comprising:

an insulator substrate 53,  
a gate electrode 54 located on the insulator substrate,  
an insulator film 56/58 provided on the substrate and gate electrode, and  
an active layer 60 including a polycrystalline silicon film on the insulator film where a drain 70, a source 72 and a channel 62 over the gate electrode are defined, wherein grain sizes of the drain and source are greater than a grain size of the channel (see the description of the first embodiment of Batra (col. 2, lines 1-34) which teaches that the source/drain regions alone are made amorphous and annealed such that their grain size is larger than that of the channel. Note also that while Batra shows in figs. 4-7 only the drain offset 66 having a larger grain size, it is taught in column 6, lines 8-10 that the channel region alone may be masked such that the entire source and drain regions have the larger grain size, not merely the offset region).

With regard to claims 9 and 10, Batra et al. teach that the grain size of the channel is 0.1  $\mu\text{m}$  (1000 Å) which is at least about 500 Å and will provide desired device characteristics such as

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on current. With regard to claims 11 and 12, Batra et al. did not expressly teach that the grain size of the channel were in a range of 1500 – 20,000 Å or 3000 – 10,000 Å. Because Batra et al. did teach that the grain size of the channel was approximately 1000Å, it is considered obvious that one of skill in the art would form the channel region having grain sizes in the range of 3000 – 10,000 Å. The motivation for doing so, as is taught by Batra et al., is that larger grains will have fewer grain boundaries and fewer dangling Si bonds to trap carriers (col. 2, lines 39–41).

Regarding claims 7 and 8, Batra did not expressly teach that the gate electrode was formed of a refractory metal, that the gate has a higher thermal conductivity than the substrate or that the gate was operable to dissipate energy received at the polysilicon film adjacent the gate. Rather, Batra teaches that the gate electrode may be formed of polysilicon (col. 4, lines 54-58). Yang teaches, with reference to column 6, lines 38-42, that a gate electrode of a thin film transistor may comprise either polysilicon or a refractory metal. Batra et al. and Yang are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the device of Batra using a refractory metal as the gate electrode rather than polysilicon. The motivation for doing so, as is taught by Yang, is that the use of either polysilicon or a refractory metal as a gate electrode is well known in the art and such use amounts to nothing more than a substitution of one well-known material for another. That a refractory metal gate electrode has a higher thermal conductivity than the insulating substrate and that it is operable to dissipate energy are no more than inherent properties of a refractory gate over an oxide substrate. Therefore, it would have been obvious to combine Batra et al. and Yang to obtain the invention of claims 7-12.

***Response to Arguments***

6. Applicant argues on pages 7-8 that, although Yang teaches a refractory gate for use in a TFT, neither reference teaches that such a refractory gate should be provided for dissipating energy to produce the claimed grain sizes. The argument is not persuasive. First, that the motivation for applicant's invention is different from that behind the Batra and Yang combination is not sufficient to support patentability. See *In re Beattie* 24 USPQ2d 1040, 1042 (Fed. Cir. 1992) "As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, law does not require that the references be combined for the reasons contemplated by the inventor." Secondly, the claims do not cite structure distinct from that made obvious by Batra and Yang. The amended limitations are merely properties possessed by a device having a refractory metal gate over an insulating substrate. Because such a device is obvious over Batra and Yang, the properties are likewise obvious.

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,


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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (703) 305-2752 (phone number after 2/9/04 – (571) 272-1728). The examiner can normally be reached on 8:00 - 5:30, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
GEORGE ECKERT  
PRIMARY EXAMINER